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U.S. Environmental Protection Agency
Region III Superfund Program

Record of Decision
Operable Unit 8 (Areas B and C)

Avtex Fibers Site
Front Royal, Virginia

August 2000

Record of Decision

Avtex Fibers Superfund Site
Front Royal, Virginia

I. THE DECLARATION

A. Site Name and Location

The Avtex Fibers Superfund Site is located at 1169 Kendrick Lane in Front Royal, Virginia (Site). The Site is located in northwestern Virginia, along the boundary of the Blue Ridge Mountains and the northern entrance of Skyline Drive in the Shenandoah National Park. This Record of Decision (ROD) addresses Operable Unit 8 (OU8) of the Site. OU8 consists of an open field (approximately 24 acres referred to as Area B), and a paved parking lot (approximately 10 acres referred to as Area C) located in the northeast portion of the Site (see Figure 1).

B. Statement of Basis and Purpose

This decision document presents the Selected Remedy for OU8 at the Avtex Fibers Superfund Site in Front Royal, Virginia, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Action of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for this action. The Commonwealth of Virginia concurs with the Selected Remedy.

C. Assessment of Site

The response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances or

contaminants from this Site that may present an imminent or substantial endangerment to public health or welfare.

D. Description of Selected Remedy

The Town of Front Royal has zoned Areas B and C for industrial land use, and future land use is reasonably anticipated to remain industrial or commercial. Residual contamination was identified in Areas B and C in the form of volatile organic compounds. The few constituents detected in surface soils were at levels several orders of magnitude below EPA Region III risk screening levels for soil ingestion under an industrial exposure scenario, therefore, these constituents do not pose a risk to human health for commercial/industrial land use. Consequently, the Selected Remedy addresses the residual contamination by ensuring that the reasonably anticipated future land use remains commercial/industrial in perpetuity.

The Selected Remedy consists of the following institutional controls:

- current land use zoning that designates Areas B and C for commercial/industrial use enforced by the Town of Front Royal, Virginia;
- a legally enforceable restrictive covenant, the Conservation and Environmental Protection Easement and Declaration of Restrictive Covenants ("Conservation Easement") filed December 7, 1999 with the Clerk's Office of Warren County, Virginia (Instrument # 990008268). The Conservation Easement prohibits the use of ground water for any purpose and restricts the portion of the site designated as Areas B and C to commercial/industrial use based on the Code of Town of Front Royal, Virginia, and other requirements or prohibitions specified in the Conservation Easement; and
- the Conservation Easement will alert future owners and users of the residual contamination, and monitor for changes in land use that would require further evaluation of the risk posed to human health.

The residual contamination identified in Areas B and C are not principal threat wastes, therefore, treatment is neither appropriate nor necessary for the Selected Remedy.

E. Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions to the maximum extent practicable. The remedy for OU8 does not satisfy the statutory preference for treatment as a principal element of the remedy. However, treatment is not necessary to protect human health and the environment because the levels of residual contamination are below EPA Region III risk-based screening levels protective of human health for commercial/industrial use.

Because the Selected Remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

F. Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this action.

- Chemicals of concern and their respective concentrations – Table 1 summarizes the constituents detected and provides the minimum and maximum concentrations of each.

- Baseline risk assessment – A baseline risk assessment was not performed because the concentrations of residual contaminants that were detected in Areas B and C were below EPA's risk-based screening criteria for the current and future anticipated land use.

- Cleanup levels – Cleanup levels were not established because soil remediation is not warranted in Areas B and C.

- Source materials constituting principal threats – The soils with residual contamination in Areas B and C are not principal threat wastes.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD – Current and anticipated future land use assumptions are discussed below in Part II, Section F. Potable water is available from the local municipal water supply system, and ground water will not be used for Areas B and C.

- Potential land and ground water use that will be available at the Site as a result of the selected remedy – Current and anticipated future land use assumptions are discussed below in Part II, Section F. The Selected Remedy will not result in use of ground water.

- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected – These items are not addressed because the Selected Remedy does not include remedial alternatives that require capital costs or O&M. Anticipated costs to implement the Selected Remedy are addressed.

- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) – Key factors associated with the Selected Remedy are discussed below in Part II, Section I and J.

G. Authorizing Signatures

Abraham Ferdas, Director
Hazardous Site Cleanup Division
Region III

Date

II. THE DECISION SUMMARY

A. Site Name, Location and Brief Description

The Avtex Fibers Superfund Site is a closed fibers manufacturing plant (National Superfund Database ID No. VAD070358684) located at 1169 Kendrick Lane in Front Royal, Virginia (Site). The Site is located in northwestern Virginia, along the boundary of the Blue Ridge Mountains and the northern entrance of Skyline Drive in the Shenandoah National Park. The facility occupies approximately 440 acres situated on the east bank of the South Fork of the Shenandoah River. The Norfolk and Western railroad bisects the property and separates 220 acres of disposal areas from over 50 acres occupied by the process facility.

The Randolph Macon Academy borders the Site along the eastern boundary. The former General Chemical facility plant is located along the north/northwest boundary of the property. Residential areas are located to the north, south and east of the property boundaries. Drainage to the river occurs through designed features such as the discharge from the on-site wastewater treatment plant, overland storm water flow, and ground water flow.

OU8 for the Site consists of an open field (approximately 24 acres referred to as Area B), and a paved parking lot (approximately 10 acres referred to as Area C) located in the northeast portion of the Site (see Figure 1). Area B is a field vegetated with grass and shrubs, and is bordered by Kendrick Lane, the access road to the plant and the railroad. Area C is a long, narrow parcel partially covered by a gravel and asphalt parking lot, and an area vegetated with grass, shrubs and trees bordered by Kendrick Lane and a residential area.

B. Site History and Enforcement Activities

Operations at the Site began in 1940, when American Viscose opened a rayon production plant. In 1963, American Viscose sold the plant and property to FMC Corporation (FMC), and in 1976, the plant and property were sold by FMC to Avtex Fibers, Inc. Subsequently, Avtex Fibers, Inc. conveyed the plant and property to its wholly owned affiliate Avtex Fibers - Front Royal, Inc. (hereinafter both companies will be referred to

as "Avtex." Rayon fibers were in constant production until the plant closed in 1989. Polyester and polypropylene were also produced over short periods of time. In November 1989, ongoing enforcement action by the Commonwealth of Virginia pursuant to state law resulted in revocation of the Avtex Fibers discharge permit. Following this action, Avtex ceased operations and shortly thereafter declared bankruptcy.

Operations at the plant generated three major waste types that were disposed on land as follows:

- metal-bearing wastewater from the production process was treated with lime in the Wastewater Treatment Plant (WWTP), and the sludge generated by that treatment was placed in five Sulfate Basins situated along the east bank of the South Fork of the Shenandoah River;
- fly ash generated from the combustion of coal in the on-site power plant was disposed in four fly ash basins and one stockpile; and
- waste viscose from the manufacturing process was disposed in 11 on-site basins.

The disposal areas for these waste streams are being addressed as other operable units.

With respect to Areas B and C (see Figure 1), which comprise OU8, review of a series of aerial photographs covering the period from 1937 through 1989 indicate that the plant manufacturing operations were not conducted in Areas B and C during the lifetime of operations. The presence of hazardous substances or contaminants detected in Areas B and C may be due to the following:

- Windblown transport – Hazardous substances or contaminants in soil would likely be the result of windblown dust or emissions from the plant stacks. Dust would have been derived from surface soils, the sulfate basins and the fly ash stockpile. The plant stack emitted process-related constituents, while the power plant emitted coal combustion by-products.
- Surface water runoff – Site hazardous substances and contaminants could have been transported to Area B by surface water runoff from the plant.

- Spills and leaks – Site hazardous substances and contaminants could have been released to Areas B and C as a result of leaks or spills of petroleum products associated with vehicle parking.

- Disposal of construction debris – Placement of scrap metal and construction debris on the ground, especially along the southern boundary of Area B, is another possible mechanism for the presence of hazardous substances or contaminants.

The combined efforts of the Removal, Enforcement and Remedial programs have been used to address the many environmental problems at the Site. In October 1984, the Site was proposed for inclusion on the CERLCA National Priorities List (NPL), and in June 1986, the listing was made final. Since being listed on the NPL, the Site has been the subject of numerous response actions performed by either Avtex, FMC or EPA. With the abrupt closing of the plant in November 1989, EPA undertook emergency and time-critical removal actions at the Site. However, the magnitude and complexity of the environmental problems at the Site continue to warrant time-critical removal actions. In addition, non-time critical removal actions and remedial responses are also underway. These actions are summarized below.

Removal Action Summary. On September 26, 1989, an On-Scene Coordinator (OSC) performed a Preliminary Assessment of the Site in accordance with the NCP. This assessment confirmed the existence of a threat to public health, welfare and the environment due to the release of polychlorinated biphenyls (PCBs), the threat of fire and explosion, and concerns associated with the integrity and management practices of the bulk storage tanks and process lines used to contain or transfer hazardous substances at the Site. In response to both verbal notice and an October 31, 1989 Unilateral Order from EPA, Avtex began cleanup actions.

At the time, a concurrent enforcement action initiated by the Commonwealth of Virginia resulted in revocation of the Avtex National Pollutant Discharge Elimination System ("NPDES") discharge permit on November 10, 1989. Predicated on the permit revocation, Avtex ceased operations at the facility and at the same time informed EPA that it would not comply with the Unilateral Order. On November 11, 1989, Avtex closed and abandoned the plant, leaving large quantities of process chemicals in and around the plant area and waste disposal areas.

On February 6, 1990, Avtex filed a petition for bankruptcy pursuant to Chapter 11 of the U. S. Bankruptcy Code. On April 12, 1990, the bankruptcy court appointed a Trustee.

It was apparent to EPA that Avtex would not address the immediate concerns at the Site, prompting the OSC to utilize the $50,000 authority pursuant to Delegation of Authority 14-1-A to initiate emergency stabilization actions at the abandoned Site. A Request for Funding (Action Memorandum) was submitted and approved by the Region on November 14, 1989, increasing the project ceiling to $1,914,095. A Request for Additional Funding and Exemption from the $2 million/12 month statutory limits for a Removal Action was submitted to the Office of Solid Waste and Emergency Response (OSWER) on January 5, 1990, and approved on February 2, 1990, increasing the ceiling to $9,229,095. On August 20, 1990, a second Request for Additional Funds and Statutory Exemption was submitted to OSWER and approved on October 20, 1990, increasing the project ceiling to $15,444,325. Another Request for Additional Funds and Statutory Exemption was submitted to OSWER on October 18, 1991, and was approved on November 22, 1991, increasing the project ceiling to $20,755,975. On September 29, 1997, an additional funding request for $33,216,144 was approved by EPA Headquarters for a ceiling increase and to modify the existing scope, to continue the mitigation of threats posed by the Site, to address physical hazards and threats and implement stabilization or disposal of removed hazardous substances. This increased the ceiling to $66,972,119. The increased ceiling was necessary to complete demolition of 17 acres of the deteriorated facility and implement treatment and disposal of generated wastes.

The additional requests and approvals for funding were necessitated by the continued degradation of the former plant production area of the facility from chemical and physical weathering of the buildings, tanks, process lines, and containers. In light of this continued degradation, EPA identified existing threats, responded to new threats, and/or potential threats to human health and the environment from the chemicals and waste materials left on-site. Through 1995, EPA's emergency and time-critical removal activities focused on the removal of accessible bulk chemicals, drums, and other containers within the huge Avtex facility.

Highlights of EPA's emergency and on-going removal response activities completed by October 1995 included: transferring approximately 2,000 tons of various chemicals for recycle/reuse, on-site and off-site treatment of an estimated 241,000 gallons of flammable and corrosive chemicals, designing and operating a wastewater treatment system to protect the South Fork of the Shenandoah River from untreated discharges,

closing 22 carbon disulfide impoundments which included treating approximately 992,000 gallons of carbon disulfide wastewater, and treating and removing approximately 1,300 cubic yards of carbon disulfide sludge. In addition, the contents of 33 large capacity storage tanks were drained. As part of that action, EPA effectively managed over 770,000 gallons of hazardous and non-hazardous liquids and 320 cubic yards of soil.

Based on a detailed evaluation report of the on-site buildings completed by EPA in August 1996, EPA completed another removal action in September 1998 to eliminate the physical and chemical hazards associated with nearly 25 acres of deteriorating buildings. Because of the threats posted by the buildings, approximately 17 acres of building structures were demolished during this removal action. As part of this action, over 225,000 cubic yards of debris and waste materials were generated, and 5,720,000 gallons of wastewater were managed. In September 1998, as part of a global settlement with EPA, FMC assumed the responsibility to complete the removal action for the buildings.

Pursuant to the terms of a Federal Consent Decree, FMC is implementing activities associated with demolition of the remaining buildings under Time-Critical Removal Actions (TCRA) and Non-Time-Critical Removal Actions (NTCRA). The scope of the TCRA for buildings is to characterize and dispose of the building demolition debris and accumulated solid waste generated by EPA's prior building demolition activities, and to address subgrade structures and appurtenances. FMC is currently implementing the TCRA buildings Response Action Plan and Field Sampling and Analysis Plan approved by EPA in October 1999. FMC has initiated characterization and off-site shipment of accumulated solid waste and screening and washing of demolition debris generated by EPA's prior demolition activities.

The scope of the NTCRA for the buildings is to decontaminate the remaining buildings and address the plant sewers. Once the remaining buildings are decontaminated, the U.S. Army Corps of Engineers will abate asbestos-containing material and demolish the remaining buildings as part of non-CERCLA actions to be taken at the Site. FMC is in the process of preparing an Engineering Evaluation/Cost Analysis (EE/CA) to assess the extent of building decontamination that is necessary, and to identify appropriate methods to complete the decontamination in preparation for demolition of the remaining buildings. FMC is currently assessing the extent of contamination within the remaining buildings to provide data needed to evaluate decontamination approaches.

FMC is also addressing the closure of the sulfate basins, wastewater treatment plant basins, and fly ash basins and stockpile as part of a NTCRA. In May 1999, FMC completed an EE/CA for these units, which identified the conceptual approach for closing these basins. EPA issued an Action Memorandum for these units, which selected the final remedy in January 2000. FMC is preparing the final design for the remedy selected for these units and expects to begin construction in late 2000.

Enforcement Action Summary. Avtex entered into an Administrative Order on Consent (AOC) with EPA in 1986 to perform a Remedial Investigation/ Feasibility Study regarding ground water contamination. That Order was amended in 1988 to include FMC as a Respondent. In June 1989, EPA issued a Unilateral Administrative Order (UAO) to Avtex and FMC requiring the companies to implement a ground water remedial action. Following the shutdown of the facility, Avtex notified EPA that it would be unable to carry out the requirements of the UAO. Thereafter, EPA suspended the UAO, having determined that additional information was necessary concerning subsurface conditions at the Site before a ground water remedy could be selected.

On February 2, 1990, EPA issued a UAO (i.e., the Wastewater Treatment Plant ("WWTP" UAO) to FMC requiring FMC to operate the WWTP to protect the South Fork of the Shenandoah River. FMC agreed to comply with that UAO. Today, FMC continues to treat wastewater generated at the Site pursuant to the WWTP terms specified in the Consent Decree. In addition, FMC continues to provide potable water to four seasonal residents in Rivermont Acres, across the South Fork Shenandoah River from the Site, as required by an EPA October 1991 UAO.

In May 1992, EPA entered into an AOC with the Bankruptcy Trustee's contractors to ensure the safe and effective removal of assets from the abandoned manufacturing plant. With EPA's oversight and support, over 44 million pounds of equipment and scrap metal have been removed for recycling or reuse.

On March 30, 1993, EPA and FMC signed an AOC, Docket No. III-93-14 (RI/FS), which required FMC to complete a portion of a site-wide RI/FS. The following areas were covered under the AOC: investigation of the viscose basins, sulfate basins, WWTP basins and residuals, fill area and fly ash piles, on-site/off-site ground water, and on-site soils. EPA performed an RI/FS for the on-site buildings, river and ecological investigation and risk assessment, and investigation of off-site soils, a ball field and the sewers.

By amendment to the existing WWTP UAO in October 1998, FMC agreed to stabilize, monitor, and manage debris and waste materials at the Site as part of on-going response activities that EPA had conducted. During late 1998 and early 1999, FMC and the United States finalized negotiations on a global settlement which resulted in a commitment by FMC to conduct all future response actions at the Site pursuant to the terms of a Federal Consent Decree. The agreement was entered by the Court in U.S. v. FMC Corp. Civ. No. 5-99CV000.54 (W.D.VA 1999) (the Consent Decree) and became effective October 21, 1999. The Consent Decree requires, among many things, that FMC finance and conduct a series of response actions based upon decision documents that are to be issued by EPA.

Remedial Action Summary. EPA issued its first ROD for the Site in September 1988, which addressed ground water contamination associated with three viscose basins on the western portion of the Site. Following the abrupt shut down of the plant and due to technical issues associated with implementing the remedy, EPA suspended that action to collect additional ground water data as part of the site-wide RI/FS.

Based on findings during EPA's emergency operations in 1989-1990, EPA issued a ROD in September 1990. Through this remedial action, approximately 7,700 tons of PCB contaminated soil and debris were excavated and disposed in an approved off-site landfill in April 1992. In addition, EPA completed the dismantling and demolition of the acid reclaim portion of the facility in April 1993. In conjunction with this action, EPA disposed of nearly 900 tons of hazardous and non-hazardous chemical waste. EPA collected and prepared approximately 2,879 drums of wastes throughout the plant for off-site treatment and completed disposal in late Spring 1994. As part of this remedial action, security measures were implemented to protect trespassers and workers from the chemical, structural and physical hazards still present at the Site.

As discussed, under the 1993 site-wide RI/FS AOC, EPA and FMC have undertaken remedial studies to determine the nature and extent of contamination for various portions of the Site. Data from these studies have been considered by EPA in formulating the response actions described in this decision document. FMC and EPA are finalizing feasibility study work plans to address OU7 and OU10 and complete the work outlined under the RI/FS AOC.

C. Community Participation

The RI Report, the FS Report and the Proposed Plan Fact Sheet for OU8 of the Avtex Fibers Site were made available to the public in August, 2000. They can be found in the Administrative Record file and information repository maintained at the EPA Docket Room in Region 3 and the Samuels Public Library. The notice of the availability of these two documents was published in the Northern Virginia Daily and the Warren Sentinel on August __, 2000. In addition a public meeting was held on August 17, 2000 to present the Proposed Plan Fact Sheet to a broader community audience. At this meeting representatives from EPA and the Virginia Department of Environmental Quality discussed the proposed approach for dealing with Areas B and C and answered questions.

D. Scope and Role of Operable Unit or Response Action

OU8 is one of ten operable units identified for the Site. These operable units are summarized below:

- OU1 addressed ground water contamination caused by fluids leaking from Viscose Basins 9, 10 and 11, but implementation of this remedial action was suspended by EPA pending the need for additional groundwater information to implement the remedy. This groundwater investigation is being performed pursuant to the 1993 RI/FS AOC. Ground water will be addressed as part of OU7;

- OU2 consisted of a remedial action to address PCB-contaminated soils by excavation and off-site disposal. This remedial action was completed by EPA in January 1992;

- OU3 was a remedial action to address the unstable acid reclaim buildings. The dismantling and demolition of the acid reclaim buildings was completed by EPA in September 1993;

- OU4 is a remedial action that addressed the need for site security to protect workers and trespassers from the physical, chemical and structural threats present at the Site. Consistent with the terms of the Consent Decree, FMC took over the lead for performing site security functions in October 1999;

- OU5 addressed the sampling, identification and disposal of drums of hazardous substances. This remedial action was completed by EPA in September 1994;

- OU6 encompassed the investigation of on-site buildings. This remedial investigation which was completed in September 1996 led to EPA's time-critical removal action to demolish high hazard process buildings in September 1997. Currently, FMC is characterizing and disposing of the building demolition debris and accumulated solid waste generated by EPA's prior building demolition activities, and will address subgrade structures and appurtenances;

- OU7 will involve remedial response actions necessary to address Viscose Basins 9, 10 and 11, ground water, and surface water. Currently, EPA and FMC are finalizing the Feasibility Study Work Plan. The feasibility study will develop and evaluate options for remedial action. Remedial actions will be conducted pursuant to the Consent Decree.

- OU8, which is addressed by this ROD, consists of Areas A, B and C. The investigation of these areas was completed in September 1995. The feasibility study conducted by FMC Corporation was completed in June 2000.

- OU9 consists of the ecological investigation and risk assessment. Based on the results of this investigation and assessment, a non-time critical removal action is being performed to close the sulfate basins, fly ash basins and stock pile and the wastewater treatment plant basins;

- OU10 will involve remedial response actions necessary to address Viscose Basins 1 through 8, the New Landfill, and the wastewater treatment plant closure. Currently, EPA and FMC are finalizing the Feasibility Study Work Plan. The feasibility study will develop and evaluate options for remedial action. Remedial actions will be conducted pursuant to the Consent Decree.

In 1995, FMC investigated the soils for OU8 (i.e., Areas A, B and C). Areas A, B and C, which comprise OU8, had been identified by the Industrial Development Authority of the Town of Front Royal and the County of Warren d/b/a Economic Development Authority ("EDA") as areas with a high priority for potential for the initial phase of redevelopment. The EDA purchased the Avtex property from the Avtex Bankruptcy Trustee by deed dated March 27, 2000. Based on the investigation findings, EPA determined that Areas B and C could be delisted from the Avtex Fibers Superfund Site. However, Area A can not be delisted from the Site at this time due to the presence of

sewer lines beneath the area. These sewer lines were not part of FMC's initial investigation, however, an evaluation is being performed as part of the FMC's non-time critical removal action in the building area.

EPA subsequently requested that FMC perform a Focused Feasibility Study to identify applicable remedial approaches for Areas B and C in accordance with the threshold and balancing criteria described in the NCP so that an appropriate remedy could be selected. The issuance of this selected remedy for OU8 is appropriate and will facilitate the EDA's efforts to redevelop Areas B and C for beneficial land use.

E. Site Characteristics

Key characteristics of the Site with respect to Areas B and C are summarized below.

Conceptual Site Model. The primary sources of potential contaminants in shallow soils in Areas B and C would have been a result of the plant manufacturing processes and associated activities. With respect to OU8, the conceptual site model reflects potential impacts to soils in Areas B and C as a result of contaminants migrating from the plant process areas or being released by activities associated with the plant. Historic aerial photographs indicate that Areas B and C were not used for plant process activities. The primary concern was contamination of shallow (i.e., 0-2 feet) soil as a result of windblown transport, surface water runoff, spills and leaks, and/or disposal of construction debris. Since the current and anticipated land use is limited by the Conservation Easement to commercial/industrial, on-site worker exposure to shallow soil is the potential exposure pathway of concern for OU8. Ecological receptors could also be exposed to contaminants present in shallow soil.

Site Overview. Area B is 24.5 acres in size, and Area C covers 10.17 acres. Area B is an open field west-southwest of the main gate bordered by Kenrick Lane, the railroad tracks, and the plant access road, and includes the guard house building. Area B is an open field with vegetation ranging from grass to shrubs and small trees. Areas C is the parking lot and undeveloped areas on the northeast side of Kendrick Lane across from the main gate. The eastern portion of the area is partially paved with gravel and asphalt, and the western portion is vegetated and undeveloped. Nether parcel contains any surface water features.

Surface and Subsurface Features. The only structure that currently exists on Area B is the former main gate and office building located at the east end of the parcel. The

only feature of Area C is the parking lot on the eastern portion. There are no known subsurface features.

Potential Contaminant Sources. Areas B and C did not contain any known or suspected sources of contamination. Historic aerial photographs indicate that Areas B and C were not used for manufacturing or associated activities. Contaminants detected in Areas B and C must have migrated or been transported from the manufacturing areas.

Media of Concern and Sampling Strategy. Shallow soil (0-2 feet) is the only environmental media of concern. The investigation of Areas B and C focused on surface soils because the potential sources of contamination would have affected principally surface soils, not subsurface soil or ground water. Ten surface soil samples were collected from Area B, and six surface soil samples were collected from Area C. In the paved portion of Area C, samples were collected as deep as 3.3 feet below grade to obtain samples below the asphalt and material used as asphalt subgrade to ensure that samples from these locations were not impacted by semi-volatile organic compounds associated with the asphalt.

All of the soil samples were analyzed for the 18 Site constituents used throughout the Site as key indicators of contamination. In addition, split soil samples from each area were also analyzed comprehensively for Target Compound List (TCL) and Target Analyte List (TAL) constituents.

Nature and Extent of Contaminants. Soil sampling locations are shown in Figure 2. Table 1 summarizes the constituents detected in surface soil samples collected from Areas B and C that were analyzed for the 18 Site constituents and TCL/TAL constituents. Table 1 presents the minimum and maximum concentration of each detected constituent, the frequency of detection, and the EPA Region III risk-based screening levels as of April 1999 based on incidental ingestion of soil by on-site workers for an industrial exposure scenario. The Region III risk-based concentrations (RBCs) are based on a $1x10^{-6}$ risk level for carcinogens, and, as per Region III guidance, a Hazard Index of 0.1 for noncarcinogenic constituents. As indicated in Table 1, arsenic was the only detected constituent that exceeded a risk-based screening level; however, the detected arsenic concentrations were similar to the range of concentrations for this metal detected in background surface soil samples collected during the Site-wide remedial investigation conducted in 1993-94. None of the constituents detected in the surface soil samples were identified as constituents of concern that required further risk evaluation as a result of the risk-based screening.

Based on the lack of contaminant concentrations at levels of concern in shallow soil, EPA determined that deeper soil and ground water in Areas B and C have not been adversely affected from the migrations of contaminants from the manufacturing areas. Furthermore, with respect to ground water beneath, Areas B and C are not hydraulically downgradient of areas of the Site with known ground water contamination.

Potential Receptors and Exposure Pathways. Under current and anticipated future land use (i.e., commercial/industrial redevelopment), the potential receptors of concern are on-site workers who could be exposed to shallow soil. Ecological receptors could also be exposed to constituents detected in shallow soil as a result of ingestion of or contact with the shallow soil.

F. Current and Potential Future Land and Water Uses

Areas B and C are permanently restricted by the Conservation Easement for light industrial/commercial use. The Conservation Easement is part of the Administrative Record. Areas B and C do not contain any surface water features, and use of ground water is not anticipated because the Site is served by a municipal water supply system.

Currently, adjacent land use consists of residential use to the northeast of Areas B and C, and commercial/industrial use for the remaining areas surrounding Areas B and C. The land use of adjacent property is not expected to change in the future.

G. Summary of Site Risks

Maximum concentrations of the constituents detected in shallow soil samples from Areas B and C were screened against EPA Region III risk based screening criteria for an industrial exposure scenario for soil. The screening results indicate the maximum concentrations of all the constituents are either below EPA Region III's risk based criteria for an industrial exposure scenario, or are within the range of concentrations detected in background surface soil samples collected during the 1993-94 Site-wide remedial investigation. Using the permanent land use restriction of commercial/industrial, the current and anticipated future risks associated with the residual contamination of the shallow soil in Areas B and C are below EPA's threshold criteria of $1x10^{-6}$ for carcinogenic risk and the Hazard Index of 1.0 for non-carcinogenic constituents.

Also, as determined by EPA's ecological risk assessment completed in February 1999, risks to ecological receptors were not identified. Consequently, constituents of concern were not identified for Areas B and C, and there are no risk drivers for these areas.

Although the residual contamination in shallow soil in Areas B and C does not pose an unacceptable risk to human health under an industrial soil exposure scenario, the human health risks associated with land use other than commercial/industrial use were not evaluated.

H. Remedial Action Objectives

Comparison of the analytical results obtained from Areas B and C to risk-based screening levels indicate that the few constituents detected in the soil are below EPA Region III risk-based criteria for soil ingestion under an industrial exposure scenario. Consequently, the soils in Areas B and C do not pose a risk to human health from exposures for a commercial/industrial scenario.

There is residual contamination present in shallow soil in both Areas B and C in the form of anthropogenic organic compounds. These compounds may pose a risk to human health under a residential scenario, but these risks were not evaluated. The permanent restriction on Areas B and C for commercial/industrial land use rule out the possibility of a residential land use scenario. Consequently, screening against residential RBCs was neither warranted nor performed.

Applicable or Relevant and Appropriate Requirements (ARARs) would include federal environmental laws and regulations or state environmental or facility siting laws that must be attained to implement the remedy. However, identification of ARARs is not relevant to Areas B and C.

Based on the above, the Remedial Action Objective (RAO) for Areas B and C is to ensure that the reasonable anticipated future land use remains commercial/industrial in perpetuity. The Conservation Easement fulfills that RAO. The purpose of this remedial action is to alert future owners and users of Areas B and C about the residual contamination, and to monitor the Site to ensure the protection of human health and the environment.

I. Description of Alternatives

Two alternatives were identified as potential remedies for Areas B and C as follows:

Alternative No. 1 – No Action; and

Alternative No. 2 – Institutional Controls.

Each of these alternatives is described below, and results of the evaluation of each alternative relative to the nine evaluation criteria identified in the NCP are also summarized.

Alternative No. 1 – No Action. Under the "No Action" alternative, institutional controls would not be implemented to restrict future land use for Areas B and C. Consequently, once Areas B and C were removed from the Site NPL boundary, these parcels would be available for unrestricted future land use, including residential development. Because the residual contamination for Areas B and C was not evaluated with respect to risks to human health using a residential exposure scenario, there is uncertainty with respect to the risks to human health. Shallow soils in Areas B and C may pose a risk to human health under a residential land use scenario. Consequently, the "No Action" alternative may not be protective of human health. There are no ARARs that need to be attained, so this threshold criterion is not an issue.

The "No Action" alternative will not provide long-term effectiveness in meeting the RAO of ensuring that future land use remains restricted to commercial/industrial development. This alternative will not reduce the concentrations of residual contamination in Areas B and C; however, the presence and concentrations of the detected contaminants do not pose a risk to human health or the environment under a commercial/industrial use scenario. There are no short-term risks to the community and on-site workers. There are no costs associated with implementation of the "No Action" alternative, and this alternative can easily be implemented. Because the risks to residential users was not evaluated and the absence of institutional controls for future land use, the Commonwealth of Virginia may not accept the "No Action" alternative. The public may not accept this alternative for the same reason, or because the unrestricted land use may be inconsistent with future development goals.

Alternative No. 2 – Institutional Controls. This alternative consists of institutional controls to prevent unacceptable exposures to residual contamination associated with reasonable anticipated future land use for commercial/industrial development. The

institutional controls consist of the Conservation Easement filed December 7, 1999 which permanently restricts Areas B and C to commercial/industrial land use. The Conservation Easement which is recorded in the Warren County, Virginia Land Records Office where the Site is situated will alert future owners and users of the residual contamination. EPA will continue to monitor the site to ensure that the permanent restrictions are adhered to.

In addition to restricting the uses of Areas B and C, the Conservation Easement specifies covenants, conditions and restrictions for the entire site property and is binding on current and future parties associated with the site. These provisions include:

- Use of ground water in any manner is prohibited.

- Areas B and C (referred to in the Conservation Easement as Parcels 2A and 2 B, respectively) are restricted to light industrial or commercial use.

- Light industrial use specifically means only those uses permitted by Section 175-65(A) of the Code of Town of Front Royal, Virginia, or as said ordinance or substantially similar successor zoning district ordinance relating to light industrial use may from time to time be amended, except that uses currently identified in Section 175-65(A)(5), Section 175-55(A)(11), (12), (13), (21), and (24) and Section 175-56 are prohibited.

- Commercial use specifically means only those uses permitted by Section 175-39 of the Code of Town of Front Royal, Virginia or as said ordinance or substantially similar successor zoning district ordinance relating to commercial use may from time to time be amended, except that uses currently identified in Section 175-39(A)(15), (27) (with respect to tourist homes, boarding houses and rooming houses) and (35), Section 175-(B)(3) (with respect to schools), (4), (5), (10) (with respect to any residential use), (14) and (15) and Section 175-39(C)(2) are prohibited.

Although the residual contamination poses no risk to human health under a commercial/industrial exposure scenario, a residential use scenario was not evaluated, and residual contamination in Areas B and C may pose a risk to human health under residential land use. However, the institutional controls restricting land development to commercial/industrial use will be protective of human health because the restrictive covenant prohibits residential use. There are no ARARs that need to be attained, so this threshold criterion is not an issue.

The institutional controls permanently in place through the Conservation Easement will provide long-term effectiveness to meet the RAO and ensure that land use for Areas B and C remains commercial/industrial. This alternative will not reduce the concentrations of residual contamination in Areas B and C; however, the presence and concentrations of residual contamination do not pose a risk to human health for commercial/industrial land use. There are no short-term risks to the community or on-site workers associated with implementation of Alternative No. 2, and this alternative can easily be implemented for costs anticipated to be less than $10,000. The Commonwealth of Virginia supports the institutional controls because land use will be restricted to use that is protective of human health. Public acceptance is also expected because the institutional controls will be consistent with future development goals (i.e., commercial/industrial use).

J. Comparative Analysis of Alternatives

Alternative No. 2 – Institutional Controls is the preferred alternative. The institutional controls already in effect that restrict future development of Areas B and C for commercial/industrial use are more protective of human health than Alternative No. 1. Although residual contamination does not pose a risk to human health under a commercial/industrial use scenario, a residential use scenario was not evaluated since it may never occur. Alternative No. 1 does not meet the RAO of ensuring that land use for Areas B and C remains commercial/industrial in the long-term, and therefore may not be protective of human health. Alternative No. 2 is acceptable to the Commonwealth of Virginia. Alternative No. 2 should be acceptable to the public because the restricted use of Areas B and C in the future to commercial/industrial development is consistent with future redevelopment goals.

[The public's views on the proposed alternatives will be more fully evaluated during the formal public comment period and will be incorporated into the final Record of Decision.]

K. Principal Threat Wastes

The residual contamination in Areas B and C is not a principal threat waste.

L. Selected Remedy

The Selected Remedy is Alternative No. 2 B Institutional Controls. Of the alternatives that were evaluated, this alternative is the most protective of human health, and this alternative satisfies the nine evaluation criteria. The Selected Remedy consists of the legally enforceable Conservation Easement which is attached to the property deed and was filed on December 7, 1999 in the public land records at the Office of Warren County, Virginia. The Conservation Easement runs with the land and is binding on current and future parties to restrict future use of Areas B and C to commercial/industrial use in perpetuity. The estimated remedy costs are anticipated to be less than $10,000 to cover legal fees and fees associated with filing the deed. There are no capital or operation and maintenance costs associated with the Selected Remedy. The expected outcome of the Selected Remedy will be immediate use of the property for commercial/industrial use. The Selected Remedy will ensure that the residual contamination in Areas B and C will not pose a risk to human health in the future.

M. Statutory Determinations

The Selected Remedy will satisfy the statutory requirements of CERCLA ' 121 (as required by the NCP ('300.430(f)(5)(ii)). The Selected Remedy will adequately protect human health and the environment through institutional controls to restrict future land use of Areas B and C to commercial/industrial development in perpetuity. The Selected Remedy will ensure that risks to human health remain below $1x10^{-6}$ for carcinogenic risk and below the Hazard Index of 1 for non-carcinogenic risk. There are no ARARs applicable to Areas B and C that need to be attained. The Selected Remedy is cost-effective with respect to the protectiveness provided. The statutory preference for treatment as a principal element of the Selected Remedy is not addressed because treatment of residual contamination is not required to achieve protection of human health and the environment. Because residual contamination will remain in Areas B and C that will not allow for unlimited use and unrestricted exposure, it will be necessary for EPA to conduct five-year reviews after the remedial action to assure that human health and the environment are being protected.

N. Documentation of Significant Changes

[Not applicable at this time.]

III. RESPONSIVENESS SUMMARY

A. Stakeholder Issues and Lead Agency Responses

[To be completed after public comment period.]

B. Technical and Legal Issues

[To be completed after public comment period.]

Figures

Figure 1
Location of Areas B and C
Avtex Fibers Superfund Site
Front Royal, Virginia

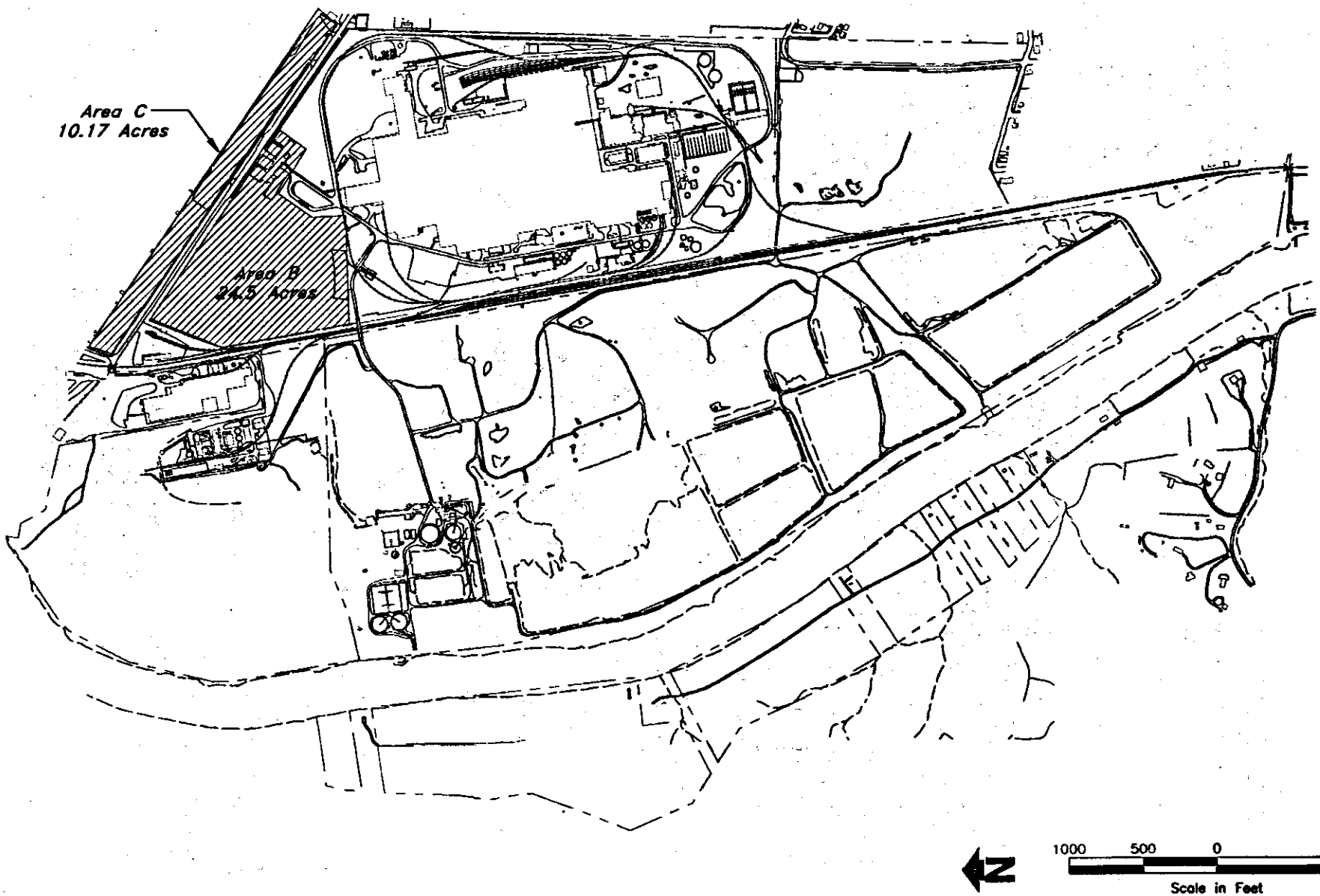
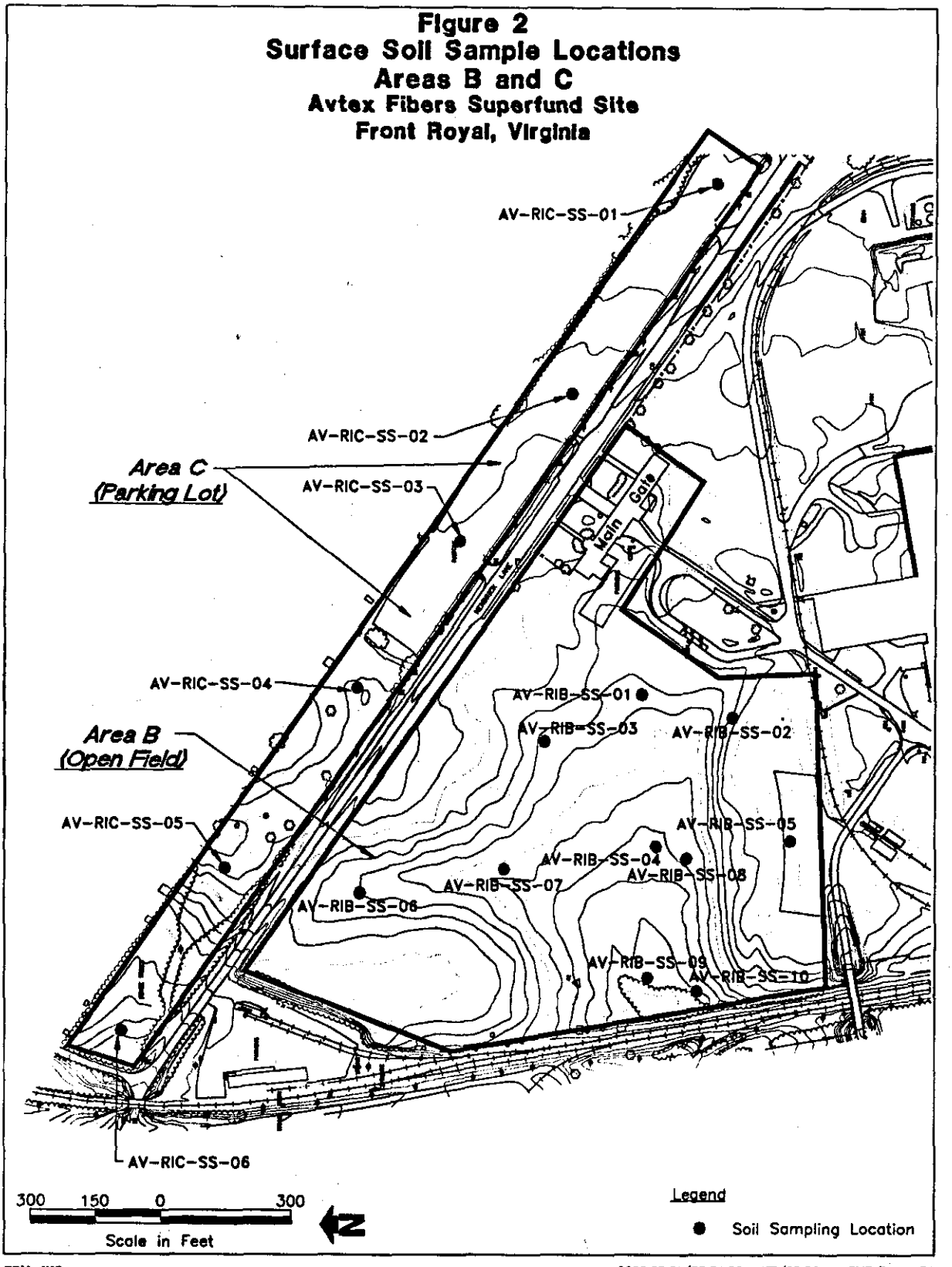


Figure 2
Surface Soil Sample Locations
Areas B and C
Avtex Fibers Superfund Site
Front Royal, Virginia



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Tables

Table 1 Comparison of Constituents Detected in Areas B and C Surface Soils to Risk-Based Concentrations, Avtex Fibers Superfund Site, Front Royal, Virginia

Constituent	Minimum Concentration	Maximum Concentration	Frequency of Detection	Risk-Based Concentration (a)	Does Maximum Concentration Exceed RBC?
AREA B					
TCL Volatile Organic Compounds (µg/kg)					
Methylene Chloride	2J	12J	10/15	760,000 C	NO
2-Butanone (MEK)	5J	6J	2/15	120,000,000 N	NO
Tetrachloroethene	3J	3J	1/15	110,000 C	NO
TCL Base Neutrals/Acid Extractables (µg/kg)					
2-Methylnaphthalene	41J	44J	2/3	4,100,000 N	NO
Phenanthrene	66J	70J	2/3	NVL	
Pesticides (µg/kg)					
4,4-DDD	0.19J	0.19J	1/3	24,000 C	NO
4,4-DDT	0.69J	0.92J	2/3	17,000 C	NO
Aldrin	0.47J	0.49J	2/3	340 C	NO
Endrin Ketone (endrin)	0.57J	0.57J	1/3	61,000 N	NO
gamma-Chlordane (chlordane)	0.26J	0.26J	1/3	16,000 C	NO
Heptachlor epoxide	0.25J	0.44J	3/3	630 C	NO
TAL Inorganics (mg/kg)					
Arsenic	2.3	5.1	6/15	3.8 C	YES
Barium	40.1	54	3/3	14,000 N	NO
Beryllium	0.29	0.52	3/3	410 N	NO
Chromium	4.0	18.3	15/15	610 N (c)	NO
Cobalt	1.4	4.4	3/3	12,000 N	NO
Copper	8.7J	9.5J	3/3	8,200 N	NO
Lead	7.5	44.6	15/15	400 (b)	NO
Manganese	68.4L	145L	3/3	4,100 N	NO
Nickel	3.5	4.4	3/3	4,100 N	NO
Vanadium	21.0	36.2	3/3	1,400 N	NO
Zinc	9.9	100.0	15/15	61,000 N	NO
AREA C					
TCL Volatile Organic Compounds (µg/kg)					
Carbon Disulfide	4J	31	4/9	20,000,000 N	NO
Methylene Chloride	2J	4J	7/9	760,000 C	NO
2-Butanone (MEK)	2J	15	4/9	120,000,000 N	NO
TCL Base Neutrals/Acid Extractables (µg/kg)					
Bis(2-Ethylhexyl)phthalate	81J	81J	1/2	410,000 C	NO
Pesticides (µg/kg)					
4,4-DDD	0.30J	0.30J	1/2	24,000 C	NO
4,4-DDT	3.8J	3.8J	1/2	17,000 C	NO
delta-BHC (beta)	0.34J	0.34J	1/2	32,000 C	NO

Table 1 (Continued)

Constituent	Minimum Concentration	Maximum Concentration	Frequency of Detection	Risk-Based Concentration (a)	Does Maximum Concentration Exceed RBC?
TAL Inorganics (mg/kg)					
Arsenic	2.4	6.0	4/9	3.8 C	YES
Barium	40.8	48.4	2/2	14,000 N	NO
Beryllium	0.44	0.66	2/2	410 N	NO
Chromium	9.7	32.7	9/9	610 N (c)	NO
Cobalt	3	4	2/2	12,000 N	NO
Copper	8.1J	8.1J	1/2	8,200 N	NO
Lead	9.4	28.4	9/9	400 (b)	NO
Manganese	253L	293L	2/2	4,100 N	NO
Nickel	2.7	2.9	2/2	4,100 N	NO
Vanadium	23.8	30.2	2/2	1,400 N	NO
Zinc	7.3	28.8	9/9	61,000 N	NO

Qualitatively and quantitatively invalid results not included
µg/kg - micrograms per kilogram, mg/kg - milligrams per kilogram
TCL - Target Compound List, TAL - Target Analyte List
NVL - No value listed for EPA Region III RBC
J - qualifier denotes that the constituent was detected below the CRDL and the value reported is an estimate.
L - This result should be consider a biased low qualitative estimate.
(a) Source: EPA Region III Risk-Based Concentration Table, April 1999, industrial soil ingestion scenerio. Non-carcinogens (N) adjusted to relfect an HQ of 0.1 per Region III guidnance.
(b) Source: Revised Interim Soil Lead Guidance (EPA, 1994).
(c) The RBC for chromium assumes 100% of the chromium reported as chromium VI.